



Test Report:RSP-500-04

500W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 65 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 3.6 V ~4.3 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	3.472 V~ 4.452 V/ 230 VAC 3.472 V~ 4.455 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : -2 %~ +2 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : -0.146 %~ 0.293 %	P
4	LINE REGULATION	V1 : -0.5 %~ +0.5 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0.146 %	P
5	LOAD REGULATION	V1 : -1 %~ +1 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0 %~ 0.146 %	P
6	SET UP TIME	230VAC : 1500 ms (Max) 115VAC : 3000 ms (Max)	I/P : 230 VAC/115VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 750 ms 115VAC/ 2202 ms	P
7	RISE TIME	230VAC : 80 ms (Max) 115VAC : 80 ms (Max)	I/P : 230 VAC/115VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 42.3 ms 115VAC/ 42.5 ms	P
8	HOLD UP TIME	230VAC : 18 ms (Max) 115VAC : 14 ms (Max)	I/P : 230 VAC/115VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 23.1 ms 115VAC/ 15.5 ms	P
9	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <10 %	P
10	DYNAMIC LOAD	V1 : 1200 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 512 mVp-p (2) 496 mVp-p (3) 488 mVp-p (4) 784 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C I/P : LOW-LINE-3V= 82 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE) NOR-LINE FULL LOAD ON: 2 SEC OFF: 2 SEC 12 HOURS	67 V~264V TEST : OK	P
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 85 VAC ~ 264 VAC O/P : FULL~MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.95 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.967 / 230 VAC PF= 0.992 / 115 VAC	P
4	EFFICIENCY	83.5 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	83.92 %	P
5	INPUT CURRENT	230V/ 2.1 A (TYP) 115V/ 4.2 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 1.956 A/ 230 VAC I = 3.908 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 40 A (TYP) 115V/ 20 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 35.2 A/ 230VAC I = 15.8 A/115VAC	P
7	LEAKAGE CURRENT	< 2 mA / 240VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.68 mA N-FG : 0.68 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~130 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	118.3 %/230VAC 118.4 %/115VAC Constant Current Limiting	P
2	OVER VOLTAGE PROTECTION	CH1 : 4.5 V ~5.3 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	5.048 V/230VAC 5.016 V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : Shut down o/p voltage , recovers automatically after temperature goes down	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Constant Current Limiting	P

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	REMOTE CONTROL	CN100 POWER ON : 0~0.8V POWER OFF : 4~10V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	POWER ON : 0~1.0 V POWER OFF : 1.1~10 V	P
2	REMOTE SENSE	S+ / S- >0.3V	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	0.32 V	P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 4 Rated : 650V 16A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue (4) Dynamic Load 90%Duty/1KHz (5) Dynamic Load 50%Duty/120Hz Ta : 25°C	(1) 388 V (2) 396 V (3) 388 V (4) 400 V (5) 396 V	P
2	Diode Peak Voltage	Q103 Rated : 40V 120 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue (4)NO LOAD TURN ON (5) Dynamic Load 90%Duty/1KHz (6) Dynamic Load 50%Duty/120Hz Ta : 25°C	(1) 14.5 V (2) 13.9 V (3) 13.5 V (4) 13.7 V (5) 25.6 V (6) 26.5 V	P
3	Input Capacitor Voltage	C 5 Rated : 180u /400V/105°C	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 372 V (2) 368 V (3) 384 V	P
4	Control IC Voltage Test	U 1 Rated : 30 V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta : 25°C	(1) 15.9 V (2) 15.8 V (3) 15.9 V	P
5	PFC Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : 600 V 20 A	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Output Short (3) Full load continue (4) Dynamic Load 50%Duty/120Hz Ta : 25°C	(1) 400 V (2) 392 V (3) 396 V (4) 405 V	P

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3KVAC/min I/P-FG : 2KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 2.554 mA I/P-FG : 2.896 mA O/P-FG : 1.798 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ I/P-FG : 500VDC>100MΩ O/P-FG : 500VDC>100MΩ	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C /70%RH	I/P-O/P : 9999 MΩ I/P-FG : 9999 MΩ O/P-FG : 9999 MΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	5 mΩ	P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 INDUSTRY AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																																																												
1	TEMPERATURE RISE TEST	MODEL : RSP-500-05 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=19.6℃ 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=49.2℃	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 19.6℃</th> <th>HIGH AMBIENT Ta= 49.2℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>TSW2</td><td>34.8℃</td><td>62.4℃</td></tr> <tr><td>2</td><td>C105</td><td>45.9℃</td><td>76.6℃</td></tr> <tr><td>3</td><td>RG1</td><td>60.7℃</td><td>90.6℃</td></tr> <tr><td>4</td><td>Q101</td><td>41.3℃</td><td>69.5℃</td></tr> <tr><td>5</td><td>Q105</td><td>51.7℃</td><td>82.4℃</td></tr> <tr><td>6</td><td>Q104</td><td>52.6℃</td><td>84.6℃</td></tr> <tr><td>7</td><td>Q103</td><td>53.4℃</td><td>84.1℃</td></tr> <tr><td>8</td><td>L100</td><td>80.2℃</td><td>113.0℃</td></tr> <tr><td>9</td><td>T1core</td><td>72.2℃</td><td>105.6℃</td></tr> <tr><td>10</td><td>T1coil</td><td>79.2℃</td><td>112.0℃</td></tr> <tr><td>11</td><td>Q4</td><td>78.2℃</td><td>114.3℃</td></tr> <tr><td>12</td><td>Q3</td><td>66.9℃</td><td>101.2℃</td></tr> <tr><td>13</td><td>U1</td><td>50.3℃</td><td>78.7℃</td></tr> <tr><td>14</td><td>T2</td><td>61.5℃</td><td>92.4℃</td></tr> <tr><td>15</td><td>C61</td><td>42.4℃</td><td>70.8℃</td></tr> <tr><td>16</td><td>TSW1</td><td>40.6℃</td><td>68.4℃</td></tr> <tr><td>17</td><td>C6</td><td>35.3℃</td><td>61.8℃</td></tr> <tr><td>18</td><td>C5</td><td>34.3℃</td><td>60.7℃</td></tr> <tr><td>19</td><td>L100</td><td>38.5℃</td><td>67.3℃</td></tr> <tr><td>20</td><td>D10</td><td>51.9℃</td><td>78.2℃</td></tr> <tr><td>21</td><td>Q2</td><td>47.2℃</td><td>75.3℃</td></tr> <tr><td>22</td><td>Q1</td><td>48.2℃</td><td>76.5℃</td></tr> <tr><td>23</td><td>BD1</td><td>43.6℃</td><td>70.9℃</td></tr> <tr><td>24</td><td>ZNR2</td><td>33.1℃</td><td>60.2℃</td></tr> <tr><td>25</td><td>LF2</td><td>32.1℃</td><td>59.2℃</td></tr> <tr><td>26</td><td>LF1</td><td>27.1℃</td><td>53.5℃</td></tr> <tr><td>27</td><td>ZNR1</td><td>24.8℃</td><td>50.6℃</td></tr> <tr><td>28</td><td>U100</td><td>36.8℃</td><td>64.3℃</td></tr> <tr><td>29</td><td>U202</td><td>50.1℃</td><td>79.1℃</td></tr> <tr><td>30</td><td>D5</td><td>42.1℃</td><td>70.5℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 19.6℃	HIGH AMBIENT Ta= 49.2℃	1	TSW2	34.8℃	62.4℃	2	C105	45.9℃	76.6℃	3	RG1	60.7℃	90.6℃	4	Q101	41.3℃	69.5℃	5	Q105	51.7℃	82.4℃	6	Q104	52.6℃	84.6℃	7	Q103	53.4℃	84.1℃	8	L100	80.2℃	113.0℃	9	T1core	72.2℃	105.6℃	10	T1coil	79.2℃	112.0℃	11	Q4	78.2℃	114.3℃	12	Q3	66.9℃	101.2℃	13	U1	50.3℃	78.7℃	14	T2	61.5℃	92.4℃	15	C61	42.4℃	70.8℃	16	TSW1	40.6℃	68.4℃	17	C6	35.3℃	61.8℃	18	C5	34.3℃	60.7℃	19	L100	38.5℃	67.3℃	20	D10	51.9℃	78.2℃	21	Q2	47.2℃	75.3℃	22	Q1	48.2℃	76.5℃	23	BD1	43.6℃	70.9℃	24	ZNR2	33.1℃	60.2℃	25	LF2	32.1℃	59.2℃	26	LF1	27.1℃	53.5℃	27	ZNR1	24.8℃	50.6℃	28	U100	36.8℃	64.3℃	29	U202	50.1℃	79.1℃	30	D5	42.1℃	70.5℃		P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 118 % LOAD Ta : 25℃	TEST : OK	P																																																																																																																												
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35℃	TEST : OK	P																																																																																																																												
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=50.8℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																																																																																												

5	TEMPERATURE COEFFICIENT	$\pm 0.05\%/^{\circ}\text{C}$ (0~50 $^{\circ}\text{C}$)	I/P : 230 VAC O/P : FULL LOAD	$\pm 0\%/^{\circ}\text{C}$ (0~50 $^{\circ}\text{C}$)	P
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -40 $^{\circ}\text{C}$ ~ +85 $^{\circ}\text{C}$ 2. Temperature change rate : 25 $^{\circ}\text{C}$ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	P
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30 $^{\circ}\text{C}$ ~ +70 $^{\circ}\text{C}$ 2. Temperature change rate : 25 $^{\circ}\text{C}$ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P
8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25 $^{\circ}\text{C}$		TEST : OK	P
9	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 $^{\circ}\text{C}$ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=50 $^{\circ}\text{C}$ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 $^{\circ}\text{C}$ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 $^{\circ}\text{C}$ LIFE TIME		(1) 481016HRS (2) 78735HRS (3) 168867HRS (4) 257720HRS	P
10	MTBF	MIL-HDBK-217F NOTICE S2 PARTS COUNT TOTAL FAILURE RATE : 187.7 KHRS			P
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50 $^{\circ}\text{C}$			P

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	Shenym	Wangdz

2007/3/20 A50-S014